DOCUMENT RESUME

ED 451 249 TM 032 477

AUTHOR Bastick, Tony
TITLE An Investigation of Ausubel's Assumption That Students Use Instructional Objectives as Advance Organisers.
PUB DATE 1999-08-00
NOTE 9p.; Paper presented at the European Conference for Research in Learning and Instruction (8th, Goteborg, Sweden, August 1999).
PUB TYPE Reports - Research (143) -- Speeches/Meeting Papers (150)
EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Advance Organizers; *Educational Objectives; Foreign Countries; *Instructional Effectiveness; Secondary Education; *Secondary School Students; Student Attitudes

ABSTRACT

This study investigated the assumption that students use instructional objectives as advance organizers. This assumption, developed by D. Ausubel (1968), is appealing to instructors, but has been difficult to test experimentally. Participants in this study were 8 teachers from 4 different ethnic groups applying the design in 2 lessons for 4 subjects taught in rural and urban schools to 492 students aged 13 to 19 years. Students in the experimental condition were given four instructional objectives at the start of each class, and asked to mark the one objective not covered at the end of each session. The inability to identity that an instructional objective was not used in the lesson was taken as evidence that the student did not use the objective as an advance organizer. Results show that 29.8% of students with the best recall ability (students who were able to remember all four objectives) could not tell which objective was not used, and therefore did not use the objectives as a conscious strategy for advance organization of the lesson material. (Contains 2 tables and 40 references.) (SLD)

Reproductions supplied by EDRS are the best that can be made
from the original document.

ED 451 249

# An Investigation of Ausubel's Assumption That Students Use Instructional Objectives as Advance Organisers

*Author:*
Tony Bastick

TM032477

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
☑ This document has been reproduced as received from the person or organization originating it.
☐ Minor changes have been made to improve reproduction quality.
• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

PERMISSION TO REPRODUCE AND DISSEMINATE THIS MATERIAL HAS BEEN GRANTED BY
Tony Bastick
TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)





BEST COPY AVAILABLE

TM

# An Investigation of Ausubel's Assumption that Students use Instructional Objectives as Advance Organisers

*Tony Bastick*
*University of the West Indies*

**Abstract**

This research investigates the assumption that students use instructional objectives as advance organizers. Advance Organizers present information before a lesson to make the lesson content more meaningful and easier to understand. The information in the Advance Organizer is presented at a higher level of abstraction and generality than the lesson content to aid the learner in subsuming or integrating the new material." (Dembo, 1991. p. 291).

This assumption is intuitively beguiling to instructors who already understand the lesson content in terms of the more abstract and generalised categories represented by the objectives. However, in as much as the meaning of these categories is abstracted and/or generalised from the content, then a student who does not know the content can attach no relevant meaning to these categories and hence cannot used them as 'advance organisers'.

Ausubel's assumption has been difficult to test experimentally because of the difficulty in measuring and controlling for the complex variables and interactions involved. This paper presents the results of an easily replicated methodology that circumvents these problems.

## Introduction

This research investigates the assumption that students use instructional objectives as advance organizers. "Advance Organizers present information before a lesson to make the lesson content more meaningful and easier to understand. The information in the Advance Organizer is presented at a higher level of abstraction and generality than the lesson content to aid the learner in subsuming or integrating the new material." (Dembo, 1991. p. 291).

This assumption is intuitively beguiling to instructors who already understand the lesson content in terms of the more abstract and generalised categories represented by the objectives. However, in as much as the meaning of these categories is abstracted and/or generalised from the content, then a student who does not know the content can attach no relevant meaning to these categories and hence cannot used them as 'advance organisers'.

Ausubel's assumption has been difficult to test experimentally because of the difficulty in measuring and controlling for the complex variables and interactions involved. For example, the resultant meaning from the supposed use of the objectives is in itself difficult to measure independently of memorisation, subject area and level of difficulty; the effects of matching instruction with learning style and prior knowledge are difficult to assess and to experimentally control. Even if all this were possible the student might have used the objectives as advance organisers but used them wrongly so that no increased understanding resulted.

Bastick, T. (1999, August). *An Investigation of Ausubel's assumption that students use instructional objectives as Advance Organisers.* Paper presented at the 8th. European Conference for Research in Learning and Instruction (EARLI 99), Göteborg, Sweden.

The theoretical significance of this research is that the design circumvents these difficult problems and can be easily replicated by teachers in their own classrooms. The educational significance of this research is that a result invalidating such a widely held assumption should have a commensurate wide impact on the practice of using advance organisers and perhaps lead research to a deeper understanding of how we actually do structure learning.

To assess the generality of the result, the experiment involved eight teachers from 4 different ethnic groups teaching 4 different subjects in rural and urban schools, each applying the design in two lessons with independent classes. 492 subjects between ages 13 to 19 took part in the experiment. The experimental conditions were strongly biased against disproving the assumption. At the start of each lesson four appropriate instructional objectives were given. One was not covered during the lesson. At the end of the lesson subjects were asked to write the four objectives and mark the one not covered. If the subjects used the objectives, or even attempted to use them, then regardless of their success, they should know the objectives that they had used. The non-identification of an instructional objective not used in the lesson is taken as evidence that a student did not use the instructional objectives as advance organisers. This is a Binomial situation - did/didn't. Hence, the proportion of students not identifying the unused instructional objective is used to test the assumption that students use instructional objectives as advance organisers - where those students have been matched on their abilities to identify the unused objective. Ranking in class tests and memory for the objectives was used to match students for this analysis.

**Contradictory research findings**

Many researchers have studied the affects of advance organisers in content areas ranging from Languages to science, and with subjects ranging in age from pre-schoolers to older adults (Chiquito, 1995; Corkill, 1988a, 1988b; Dame, 1995; Groller, 1991; Harvey & Jahns, 1988; Healy, 1989; Kooy, 1992; LeSourd, 1988; Maier, 1993; Relan, 1991; Tajika, 1988). Some researchers have found that advance organisers improve aspects of learning such as recall, comprehension or transfer; yet others have found that advance organisers make no significant difference.

Multi-media advance organizers have been widely used in language teaching (Chung, 1996). For example, Julia Hanley (1995) compared video with pictures and teachers' narrative as advance organisers in language classes as did Carol Herron (1995) for teaching French. Advance Organizers have been found to improve content memory. Advance organizers had been successfully used in learning computing. Sook-Hi Kang (1997) found advance organizers made a significant difference in facilitating learning in a computer simulation environment and Loretta Cardinale (1991) found advance organisers facilitated learning for pre-service teachers in an introductory microcomputer class. Advance organisers seem to have been most successfully used to improve the recall of textual material, again, mainly in foreign language teaching. For example, Carol Herron, (1994) found that advance organizers consisting of several short sentences, written in French, that summarised chronologically the events in the video, facilitated student listening comprehension, and Herman Teichert (1996) found that the use of advance organizers (with video- and audiotapes) developed superior listening skills in German classes. Steven Rinehart working with Mary Alice Barksdale-Ladd in 1991 found advance organisers worked to improve text recall by 30 seventh grade students who had reading problems. The following year Steven Rinehart, then working with William Welker (Rinehart & Welker, 1992) again reported that advance organizers did improve text recall by seventh grade students. In a study of 35 middle school students Jim Snapp and John Glover (Snapp & Glover, 1990) also found that advance organisers helped recall. They found that students who read and paraphrased an advance organizer prior to study, correctly answered significantly more lower-order study questions than did students not encountering the advance organizer.

In contradiction to the above findings, many researchers have found that advance organisers make no significant difference. For example in science education, Elizabeth Bricker (1989) found advance organisers had no significant effect in her comparative study of students results in second, third, and fourth grader science programs. Similarly, in an experiment by Kirkland (1995) four teachers developed 15 lessons plans, each covering a different science topic in eighth grade science. These were presented to 317 students. Post-presentation tests showed that the presence or absence of advance organizers had no affect and that the comprehension of 68 special education students in the group was actually adversely affected by the presence of advance organizers. Houshmand Saidi (1994) found that advance organizers did not improve students' achievement in computer-assisted video instruction. Similarly, Moon K. Chang (1992) used advance organisers to aid students' learning by watching a film, yet found that the advance organisers had no significant effect. Joseph Lawton and Ann Johnson, (Lawton & Johnson 1992) used advance organisers to teach music to pre-schoolers and also found that found they had no significant effect upon the children's learning. Again, in two separate studies (n = 33 and n = 66) David Lane (1988) found advance organisers had no significant effect on the test performance of undergraduate students.

**Counter indicative theoretical considerations**

With so much evidence for and against we might ask if advance organisers work or not. It is obvious that presenters, trainers and teachers use instructional objectives to post-organise their knowledge. However, its does not seem plausible that an instructional objective that is not understood could be used to categorise information as it is presented by a teacher. This dependence of the advance organiser on prior knowledge was supported in reviews of the topic by Thomas Williams and Earl Butterfield, (Williams & Butterfield, 1992a , 1992 b) which showed that the effects of advance organizers do on comprehension depend on the subject's previous knowledge. For example, verbal advance organizers assisted text comprehension of children with strong prior knowledge, while the addition of a pictorial component aids comprehension of children with weak prior knowledge (Townsend & Clarihew, 1989). Classical memory experiments on the 'recency effect' by Herman Ebbinghaus, replicated by Mary Calkins in the 1890's and many others since (Bolhuis & Van Kampen, 1988; Madigan & O'Hara, 1992; Murray, 1976) have shown that the traditional sequencing of advance organisers before the learning to which they apply can be expected to reduce their effect. Experiments by John Glover (Glover, 1990) support this 'recency effect' expectation: Namely, that the inevitable long delay between the first advance organizers and the content to which they apply is unlikely to enhance the effects of these earlier advance organizers.

**Methodological problems in trying to test Advance Organizers**

In 1990 a review by John E. McEneany of four studies conducted by the originator of the concept Ausubel, raised serious doubts about the efficacy of advance organizers under a variety of circumstances. In addition, this review questioned the adequacy of the definition of 'advance organizer'. However, there are many problems in designing fundamental research on the concept of advance organizers that may have inhibited study, but not use, of the concept since 1990. For example, the learning product that would be assessed as resulting from the way the advance organizer was used might depend on other variables that could be even more complex to control and assess - prior learning, learner motivation, complexity of the topic, quality of

BEST COPY AVAILABLE

teaching, learning/teaching style, etc. Even, equating criterion standards of learning products across content areas and age of learners and linking them to use of the advance organiser is a daunting task.

**Research design to test Advance Organizers**

This research uses a simple replicable design that cuts across the difficulties involved in using the traditional approach of designing controls to justify inference of a learning process from an assessed product. It focuses on a necessary condition of the process, regardless of the success of the learning outcome. This is a falsifying design in which, for added rigour, the effects to be falsified are enhanced by the design. Simply, subjects were shown 4 instructional objectives for the first 10 minutes of a 30 minute instruction period. To draw their attention to the importance of these objectives as advance organizers, subjects are told that they will be used in the lesson. This gives better than 1:3 exposure:recall time. However, one randomly positioned objective was not used in that period. At the end of the instruction the subjects were asked to recall the four objectives and identify which one was not used. The premise was that if a learner had made use of the objectives as advance organizers, then regardless of her/his success, s/he would be able to identify the objective they had *not* used. The falsification criterion is: The non-identification of an instructional objective not used in the lesson is taken as evidence that a subject has not used the instructional objectives as advance organisers. Hence, any subject that can remember all the instructional objectives, but cannot identify the one that was not used, could not have used the objectives as advance organizers. The teacher/instructor was blind to the true purpose of the experiment and this was checked by a content analysis of the teacher/instructor explanation of the outcome of the experiment. This design allowed for replication across content areas at different levels and across teacher/instructors and subjects of varying abilities.

*Subjects and results*

The data for this experiment were gathered in secondary schools in Fiji. 13 teachers each in a different school gave one or two lessons in which the data was gathered. 24 lessons were given in all and these covered eight curriculum subject areas - basic Science, Biology, Chemistry, English, Geography, History, Mathematics, and Physics. 684 students took part, 568 from urban schools and 116 from rural schools. The average class size was 31. The average age of the students was 16 years and ranged from 12 to 19 years. There were 382 males and 302 females.

**Main results**

The main results showed 29.8% of subjects with best recall did not use instructional objectives as advance organizers. Table 1 gives the significance of the main result.

*Table 1: Highly significant results*

| Chi-Square | Value | DF | Significance |
|---|---|---|---|
| Pearson | 225.76536 | 4 | .00000 |
| Likelihood Ratio | 249.46094 | 4 | .00000 |
| Mantel-Haenszel test for linear association | 173.26589 | 1 | .00000 |
| Minimum Expected Frequency - | 14.711 | | |

Table 2 shows the main results

*Table 2. Subjects who remembered the objectives but could not identify which was not covered - disproving the use of instructional objectives as advance organizers.*

N3 Missing objective by MI Memory Index - objectives remembered

Page 1 of 1

| N3 | MI 0 | 1 | 2 | 3 | 4 | Row Total |
|---|---|---|---|---|---|---|
| 0 Not identified | 43 | 54 | 94 | 189 | 70 | 450 |
| | 28.3 | 36.8 | 66.4 | 163.8 | 154.6 | 65.8% |
| | 9.6% | 12.0% | 20.9% | 42.0% | 15.6% | |
| | 100.0% | 96.4% | 93.1% | 75.9% | 29.8% | |
| | 6.3% | 7.9% | 13.7% | 27.6% | 10.2% | |
| 1 Was Identified | 0 | 2 | 7 | 60 | 165 | 234 |
| | 14.7 | 19.2 | 34.6 | 85.2 | 80.4 | 34.2% |
| | .0% | .9% | 3.0% | 25.6% | 70.5% | |
| | .0% | 3.6% | 6.9% | 24.1% | 70.2% | |
| | .0% | .3% | 1.0% | 8.8% | 24.1% | |
| Column Total | 43 6.3% | 56 8.2% | 101 14.8% | 249 36.4% | 235 34.4% | 684 100.0% |

The main result is that of the 235 subjects who remembered all 4 instructional objectives, 70 (29.8%) could not identify which instructional objective was not used. Hence, these subjects could not have used the instructional objectives as advance organizers.

## Conclusion

This research design assumes that the students are not using the objectives as advanced organizers at some unconscious level and are unaware that they are doing so. The result proves that 29.8% of the students with the highest recall ability did not utilise the objectives as a conscious strategy for advance organisation of the lesson material. It is possible that some of these students could have been using the objectives as advance organisers at some subconscious level of which they had no awareness. However, the apparent lesson emphasis on successful rote learning would make this an unlikely conjecture. Hence, we can conclude that in a typical lesson students do not consciously use the instructional objectives as advance organisers.



BEST COPY AVAILABLE

References

Ausubel, D. P. (1968). *Educational Psychology: A cognitive view*. New York: Holt, Rinehart and Winston.

Bolhuis, J. J. & Van Kampen (1988). Serial-position curves in spatial memory of rats; primary and recency effects. *Quarterly Journal of Experimental Psychology: Comparative and Physiological Psychology, 40*, 135-149.

Bricker, E. J. (1989). The Effect of Advance Organizers in the Teaching of Science. (ERIC Document Reproduction Service No. ED 313 682)

Cardinale, L. A. (1991). Preparing Preservice Students to Learn about Computers with Advance Organizers. *Journal of Computing in Teacher Education*; v7 n4 p16-19

Chang, M. K. (1992). Advance Organizers, Memory Tasks, and Anxiety of Children with Mild Handicaps. *Reading Improvement*; v29 n1 p56-57

Chiquito, A. B. (1995). Metacognitive Learning Techniques in the User Interface: Advance Organizers and Captioning. *Computers and the Humanities*; v28 n4-5 p211-23

Chung, J. (1996). The Effects of Using Advance Organizers and Captions To Introduce Video in the Foreign Language Classroom. *TESL Canada Journal*; v14 n1 p61-65

Corkill, A. J. (1988a). Advance Organizers: Retrieval Context Hypotheses. *Journal of Educational Psychology*; v80 n3 p304-11

Corkill, A. J. (1988b). Advance Organizers: Concrete Versus Abstract. *Journal of Educational Research*; v82 n2 p76-81

Dame, M. A. (1995). Teaching Library Skills and Content to Linguistically Diverse Students: The Role of Advance Organizers and Visual Resources. *MultiCultural Review*; v4 n4 p40-44

Dembo, M. H. (1991). *Applying Educational Psychology in the Classroom*. (4th Ed.). New York: Longman.

Downing, A. (1994, July). An Investigation of the Advance Organizer Theory as an Effective Teaching Model. Paper presented at the 24th Annual Meeting of the Australian Teacher Education Association, Brisbane, Queensland, Australia.

Glover, J. A. (1990). Advance Organizers: Delay Hypotheses. *Journal of Educational Psychology*; v82 n2 p291-97

Groller, K. L. (1991). Does Instruction on Metacognitive Strategies Help High School Students Use Advance Organizers? *Journal of Reading*; v34 n6 p470-75

Hanley, J. E. B. (1995). Using Video as an Advance Organizer to a Written Passage in the FLES Classroom. *Modern Language Journal*; v79 n1 p57-66

Harvey, R. L. & Jahns, I. R. (1988). Using Advance Organizers to Facilitate Learning among Older Adults. *Educational Gerontology*; v14 n2 p89-93

Healy, V. C. (1989). The Effects of Advance Organizer and Prerequisite Knowledge Passages on the Learning and Retention of Science Concepts. *Journal of Research in Science Teaching*; v26 n7 p627-64

Herron, C. (1994). An Investigation of the Effectiveness of Using an Advance Organizer to Introduce Video in the Foreign Language Classroom. *Modern Language Journal*; v78 n2 p190-98

Herron, C. A. (1995). A Comparison Study of Two Advance Organizers for Introducing Beginning Foreign Language Students to Video. *Modern Language Journal*; v79 n3 p387-95

Kang, S. (1997). The Effects of Using an Advance Organizer on Students' Learning in a Computer Simulation Environment. *Journal of Educational Technology Systems*; v25 n1 p57-65

Kiewra, K. A. (1997). Effects of Advance Organizers and Repeated Presentations on Students' Learning. *Journal of Experimental Education*; v65 n2 p147-59

BEST COPY AVAILABLE

Kirkland, C. E. (1995, April). Using Advance Organizers with Learning Disabled Students. Paper presented at the Annual Meeting of the American Educational Research Association, San Francisco, CA.

Kooy, T. (1992). The Effect of Graphic Advance Organizers on the Math and Science Comprehension with High School Special Education Students. *B.C. Journal of Special Education*; v16 n2 p101-11

Lane, D. S. (1988). The Relationship of Student Interest and Advance Organizer Effectiveness. *Contemporary Educational Psychology*; v13 n1 p15-25

Lawton, J. T. & Johnson, A. (1992). Effects of Advance Organizer Instruction on Preschool Children's Learning of Musical Concepts. *Bulletin of the Council for Research in Music Education*; v111 p35-48

LeSourd, S. J. (1988). Using an Advance Organizer to Set the Schema for a Multicultural Lesson. *Journal of Reading*; v32 n1 p12-18

Madigan, M. W. & O'Hara, R. (1992). Short term memory at the turn of the century. *American Psychologist, 47*, 170-174.

Maier, J. (1993). Relating Here to There: Globes and World Maps as Advance Organizers. *Social Studies and the Young Learner*; v5 n3 p9-11

McEneany, J. E. (1990). Do Advance Organizers Facilitate Learning? A Review of Subsumption Theory. *Journal of Research and Development in Education*; v23 n2 p89-96

Murray, D. J. (1976). Research on human memory in the nineteenth century. *Canadian Journal of Psychology, 30*, 201-220.

Relan, A. (1991). Effectiveness of a Visual Comparative Advance Organizer in Teaching Biology. *Research in Science and Technological Education*; v9 n2 p213-22

Rinehart, S. D. & Barksdale-Ladd, M. A. (1991). Effects of Advance Organizers on Text Recall by Poor Readers. *Journal of Reading, Writing, and Learning Disabilities International*; v7 n4 p321-35

Rinehart, S. D. & Welker, W. A. (1992). Effects of Advance Organizers on Level and Time of Text Recall. *Reading Research and Instruction*; v32 n1 p77-86

Saidi, H. (1994). The Impact of Advance Organizers upon Students' Achievement in Computer-Assisted Video Instruction. *Journal of Educational Technology Systems*; v22 n1 p29-38

Snapp, J. C. & Glover, J. A. (1990). Advance Organizers and Study Questions. *Journal of Educational Research*; v83 n5 p266-71

Tajika, H. (1988). Effects of Pictorial Advance Organizers on Passage Retention. *Contemporary Educational Psychology*; v13 n2 p133-39

Teichert, H. U. (1996). A Comparative Study Using Illustrations, Brainstorming, and Questions as Advance Organizers in Intermediate College German Conversation Classes. *Modern Language Journal*; v80 n4 p509-17

Townsend, M. A. R. & Clarihew, A. (1989). Facilitating Children's Comprehension through the Use of Advance Organizers. *Journal of Reading Behavior*; v21 n1 p15-35

Williams, T. R.; Butterfield, E. C. (1992a). Advance Organizers: A Review of the Research -Part I. *Journal of Technical Writing and Communication*; v22 n3 p259-72

Williams, T. R.; Butterfield, E. C. (1992b). Effects of Advance Organizers and Reader's Purpose on the Level of Ideas Acquired from Expository Text - Part II. *Journal of Technical Writing and Communication*; v22 n3 p281-99 ■